Summary of Product Characteristics

1. NAME OF THE MEDICINAL PRODUCT

Sorbisterit, powder for oral/rectal suspension

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

1 g powder contains:
759 – 949 mg calcium polystyrene sulphonate, corresponding to 1.8 mmol calcium.
Excipients: 50.74 mg – 240.74 mg sucrose
20 g powder contain:
15.18 – 18.98 g calcium polystyrene sulphonate, corresponding to 36 mmol calcium
Excipients: 1.01 – 4.81 g sucrose
For a full list of excipients, see section 6.1.

3. PHARMACEUTICAL FORM

Powder for oral/rectal suspension
cream to light brown fine powder

4. CLINICAL PARTICULARS

4.1 Therapeutic indications

Treatment of hyperkalaemia, in patients with acute and chronic renal insufficiency, including patients undergoing dialysis treatment.

4.2 Posology and method of administration

To be administered orally or as a retention enema.
The dosing recommendations are to be looked upon as guidelines. The exact need should be decided depending on regular clinical and biochemical controls.
The length of treatment needed with Sorbisterit cation exchange resin depends on the results of the daily measurement of the serum potassium. If serum potassium falls to 5 mmol/l, therapy should be suspended. When the serum potassium rises above 5 mmol/l, therapy should be recommenced.

Oral route:
In adults, including the elderly:
20 grams powder 1 to 3 times daily (1 measuring spoon), stirred into about 150 ml liquid.
In infants and children:
0.5 to 1.0 g/kg body weight per day in several doses, stirred into about 150 ml liquid. This preparation must be taken in at least three divided doses over a period of 24 hours.

Calcium polystyrene sulphonate should not be given orally to neonates.
Sorbisterit must be taken after an interval of at least 3 hours after antacids and laxatives such as
magnesium hydroxide, aluminium hydroxide or calcium carbonate. (see section 4.4).
Sorbisterit must be taken with food.
For suitable liquids for dilution of Sorbisterit before oral administration, see section 6.6.

Rectal route (Retention enema):
In adults, including the elderly:
After a cleansing enema, 40 g (2 measuring spoons) is suspended in 150 ml 5% glucose solution,
administered 1 to 3 times daily. In the initial stages administration by the rectal route as well as orally may help to achieve a rapid lowering of the serum potassium level.
Duration of retention: 6 hours
Children:
When it cannot be given orally, a dose may be administered rectally using a dosage at least as large as that which would have been given orally, diluted in the same proportions as described for adults. Following the retention of the enema, the colon should be irrigated to ensure proper removal of the resin.
However, special care is required when administering rectally to children and neonates, since excessive dosage or inadequate dilution could result in impaction of the resin. The risk of gastro-intestinal haemorrhage or necrosis of the colon means that special attention should be paid when being given to premature infants or neonates with a low bodyweight (see section 4.4).

4.3 Contraindications

The use of Sorbisterit is contra-indicated in patients with:
- plasma potassium levels below 5 mmol/l
- conditions associated with hypercalcaemia (e.g. hyperthyroidism, multiple myeloma,
- sarcoidosis and metastatic carcinoma)
- hypersensitivity to the active substance or to any of the excipients
- obstructive bowel disease
- reduced motility of the gut
- concomitant administration of sorbitol (see section 4.5)
- risk of colonic necrosis
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Neonates:
Sorbisterit should not be administered orally to neonates and is also contra-indicated by any route in neonates with reduced gut motility (e.g. post-operatively or drug-induced).

4.4 Special warning and precautions for use

Sorbisterit cation exchange resin is not sufficiently effective in cases of hyperkalaemia with potassium levels exceeding 6.5 mmol/l and/or changes in the ECG. In this situation, taking emergency measures (administration of sodium bicarbonate, glucose insulin drip) or dialysis must be considered.
The possibility of severe potassium depletion should be considered and adequate clinical and
biochemical control is essential during treatment, especially in patients on digitalis. Administration of the resin should be stopped when the serum potassium falls below 5 mmol/l.
As a result of the intake of calcium, there is a chance of excessive elevation of the serum calcium, particularly in cases where the patient is receiving a calcium-rich diet or using other preparations that contain calcium, such as phosphate binders or vitamin D analogues. It is therefore advisable to
monitor the serum calcium concentrations constantly.

Summary of Product Characteristics

The objectives of therapy with Sorbisterit cation exchange resin must be supported by other measures such as restriction of the potassium intake, monitoring of acidosis and the use of high-calorie
foodstuffs.
Since Sorbisterit is like other polystyrene sulphonate resins in that it is not wholly selective for
potassium, hypomagnesaemia may arise. The serum magnesium level must therefore be monitored during treatment with Sorbisterit.
Treatment with Sorbisterit must be stopped if clinically significant constipation occurs.
20 g Sorbisterit contain 4.81 g sucrose, corresponding to about 0.41 carbohydrate exchanges (CE). This should be considered in patients with diabetes mellitus.
Sorbisterit must be taken after an interval of at least 3 hours after antacids and laxatives such as
magnesium hydroxide, aluminium hydroxide or calcium carbonate since concomitant administration may cause metabolic alkalosis (see section 4.5).
Sorbitol must not be used as a laxative with Sorbisterit, either orally or rectally, because of the risk of colonic necrosis (see section 4.3).
Oral administration must be done with care to avoid aspiration. Sorbisterit must be administered to the patient in a sitting position if possible.
Patients with rare hereditary disorders such as fructose intolerance, glucose-galactose malabsorption or sucrase-isomaltase deficiency must not take this medicine.
In neonates, calcium polystyrene sulphonate should not be given by the oral route (see section 4.3). In children and neonates, particular care is needed with rectal administration as excessive dosage or
inadequate dilution could result in impaction of the resin. Due to the risk of digestive haemorrhage or colonic necrosis, particular care should be observed in premature infants or low birth weight infants.

4.5 Interaction with other medicinal products and other forms of interaction

Concomitant use contraindicated

- Sorbitol (oral or rectal): Concomitant use of sorbitol with calcium polystyrene sulphonate may cause colonic necrosis. Therefore, concomitant administration of sorbitol with calcium polystrene sulphonate is contraindicated (see section 4.3).

To be used with caution

- Cation-donating agents: may reduce the potassium binding effectiveness of calcium polystyrene sulphonate.
- Non-absorbable cation-donating antacids and laxatives: There have been reports of systemic
- alkalosis following concurrent administration of cation-exchange resins and non-absorbable cation-donating antacids and laxatives such as magnesium hydroxide, aluminium hydroxide and calcium carbonate. A certain interval must be observed with respect to these medications when taking Sorbisterit (see section 4.2 and 4.4).
- Aluminium hydroxide: Intestinal obstruction due to concretions of aluminium hydroxide has been reported when aluminium hydroxide has been combined with the resin (sodium form).
- Digitalis-like drugs: The toxic effects of digitalis on the heart, especially various ventricular
- arrhythmias and A-V nodal dissociation, are likely to be exaggerated if hypokalaemia and/or
- hypercalcaemia are allowed to develop (see section 4.4).
- Lithium: Possible decrease of lithium absorption.
- Levothyroxine: Possible decrease of levothyroxine absorption.
- Tetracyclines: Possible decrease of tetracycline absorption due to calcium ions released from the resin ino the gastrointestinal tract.
- Thiazide diuretics or loop diuretics: Concomitant use of thiazide diuretics and loop diuretics can increase the risk of hypokalaemia.
- Anticholinergics: Increased risk of gastrointestinal side effects from Sorbisterit due to reduced motility of the stomach.

4.6 Pregnancy and lactation

Pregnancy: There are no data on the use of calcium polystyrene sulphonate during pregnancy. Animal studies are insufficient with respect to reproduction toxicity. The potential risk for humans is unknown. Sorbisterit should not be used during pregnancy unless clearly necessary.
Lactation: No data is available on the use of calcium polystyrene sulphonate by women who are breast-feeding. Sorbisterit should not be used during breast-feeding unless strictly necessary.

4.7 Effects on ability to drive and use machines

Sorbisterit powder for oral/rectal suspension has no or negligible influence on driving or using
machines.

4.8 Undesirable effects

The frequencies of side effects are categorised as follows:
Very Common:(> 1/10)
Common:(> 1/100,< 1/10)
Uncommon:(> 1/1000,< 1/100)
Rare:(> 1/10000,< 1/1000)
Very rare :(< 1/10000)
Not known (cannot be estimated from the available data)

Metabolism and nutrition disorders:
Common: hypercalcaemia, hypokalaemia, hypomagnesaemia

Respiratory, thoracic and mediastinal disorders:
Very rare: acute bronchitis and/or bronchopneumonia associated with the inhalation of calcium polystyrene sulphonate

Gastrointestinal disorders:
Common: nausea, vomiting
Uncommon: constipation, diarrhoea, intestinal obstruction, gastric ulcers, colonic necrosis leading to perforations, anorexia
Rare: in severe cases occlusive ileus due to intestinal clumping of the resin, faecal impaction following rectal administration in children, gastrointestinal concretions following oral administration in newborns.
In premature infants and neonates with low birth weights, haematochezia has been observed after administering enemas containing polystyrene sulphonate resins.

In case of oral administration, patients may have difficulties swallowing the rather large amount of dissolved powder. The extent of this problem is a function of the individual disposition, the disease, the administration and the duration of the treatment.

4.9 Overdose

Biochemical disturbances from overdosage may give rise to clinical signs of symptoms of hypokalaemia, including ECG abnormalities, impaired heart function, irritability, confusion, delayed thought processes, muscle weakness, hyporeflexia and eventual paralysis. Electrocardiographic changes may be consistent with hypokalaemia or hypercalcaemia; cardiac arrhythmia may occur.
Further symptoms of overdose may be constipation and occlusive ileus, and sodium and water retention. Appropriate measures should be taken to correct serum electrolytes and the resin should be removed from the alimentary tract by appropriate use of laxatives or enemas.

5. PHARMACOLOGICAL PROPERTIES

5.1 Pharmacodynamic properties

Pharmacotherapeutic group: Drugs for treatment of hyperkalaemia and hyperphosphataemia
ATC code: V03AE01
Sorbisterit is a cation exchange resin which releases calcium in the intestines and binds potassium. This reduces the absorption and metabolic availability of potassium.

5.2 Pharmacokinetic properties

Absorption / distribution / excretion:
The calcium bound in the resin is exchanged for the potassium present in the intestines. According to various publications, 1 g of the exchange resin can bind 0.7 mmol potassium *in vivo*.
Polystyrene resins are insoluble and non-absorbable. They pass through the intestinal tract and are almost completely excreted with the faeces. The bound potassium is subsequently excreted from the body together with the exchange resin in the faeces. Calcium released from the resin is partly absorbed. The electrolyte is subject to physiological pathways of absorption, distribution and elimination.
The capacity of Sorbisterit for potassium exchange depends to a considerable extent on pH because other cations such as ammonium and magnesium as well as lipids and proteins also have a high affinity for the exchange resin as they pass through the intestines.

5.3 Preclinical safety data

Preclinical studies on Sorbisterit are not available.
Single dose toxicity studies with oral, intraperitoneal or subcutaneous administration of calcium polystyrene sulphonate did not reveal a risk of acute toxicity. No further preclinical studies with calcium polystyrene sulphonate are available.

6. PHARMACEUTICAL PARTICULARS

6.1 List of excipients

sucrose anhydrous citric acid

6.2 Incompatibilities

Not applicable

6.3 Shelf life

3 years
25 days after first opening

6.4 Special precautions for storage

Keep the container tightly closed in order to protect from moisture.

6.5 Nature and contents of container

Polyethylene multidose container.
Pack size: 1 container with 500 g powder
A 20 g measuring spoon consisting of polystyrene accompanies the product.

6.6 Special precautions for disposal and other handling

Suitable liquids for dissolving Sorbisterit before oral administration are water, tea and soft drinks. Sorbisterit must not be taken with fruit juices that contain a high level of potassium.

Suitable liquids for dissolving Sorbisterit before rectal administration are 5% glucose solutions.

7. MARKETING AUTHORISATION HOLDER

To be completed nationally

8. MARKETING AUTHORISATION NUMBER(S)

To be completed nationally

Summary of Product Characteristics

9. DATE OF FIRST AUTHORISATION / RENEWAL OF THE AUTHORISATION

10. DATE OF REVISION OF THE TEXT

To be completed nationally.